

Near Shore Studies

OBJECTIVES:

Identify nearshore areas with persistent low clarity

Characterize how meteorological conditions influence clarity nearshore

Classify particles (organic, mineral or diatom)

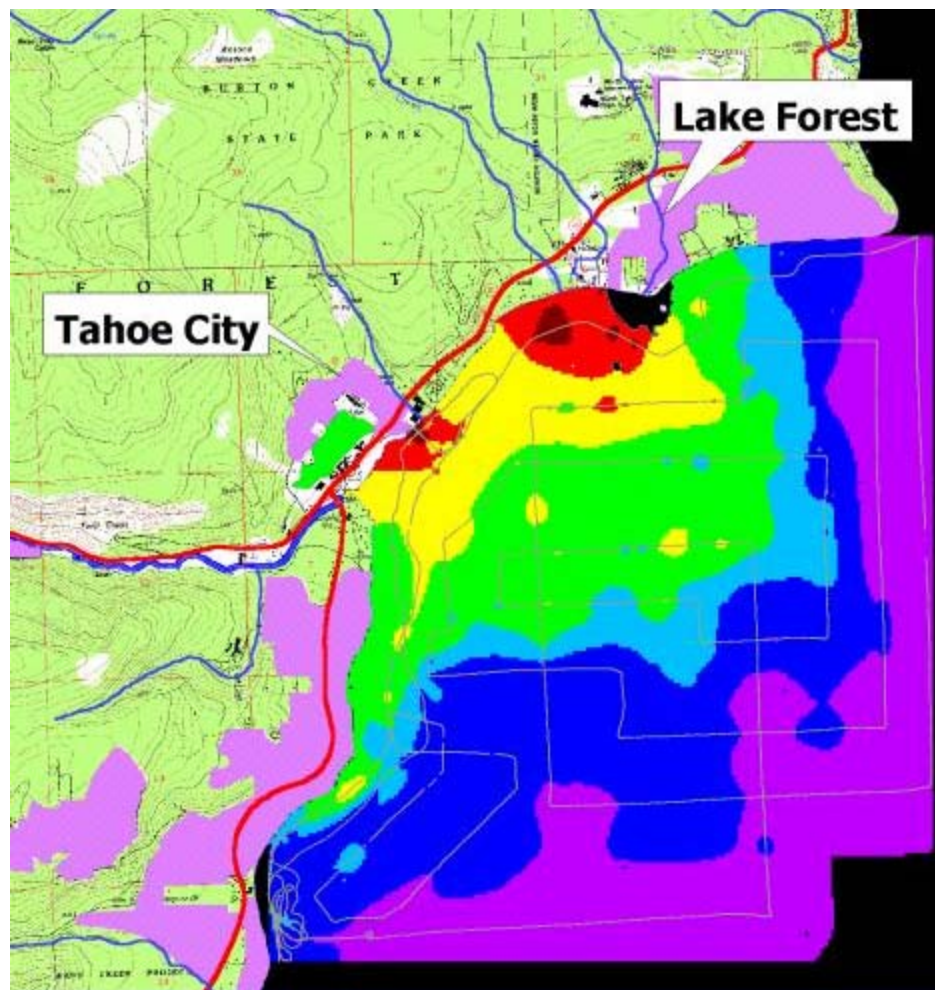
Ken Taylor, Rick Susfalk, Margaret Shanafield
Desert Research Institute





Particle
composition

Particle size
(measured by
UCSD)

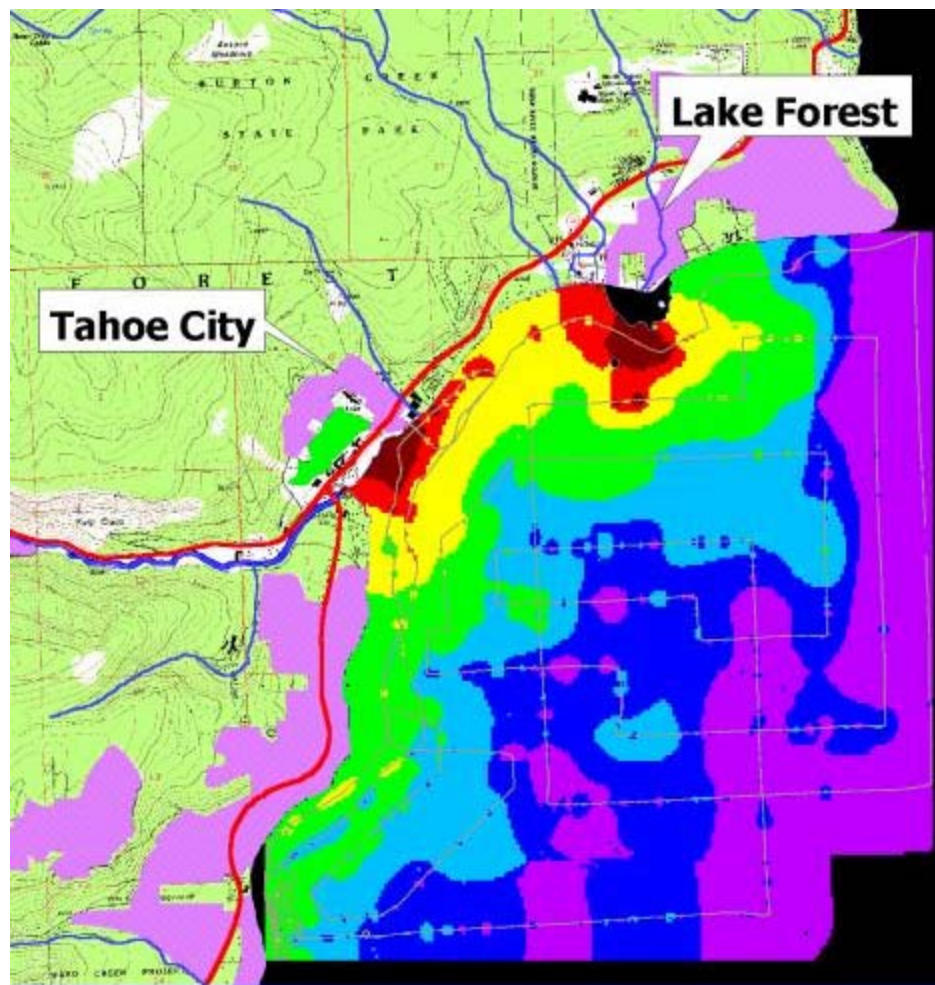


Turbidity

Red > 0.25 ntu
Purple < 0.1 ntu

1 mile

Sept 18, 2001



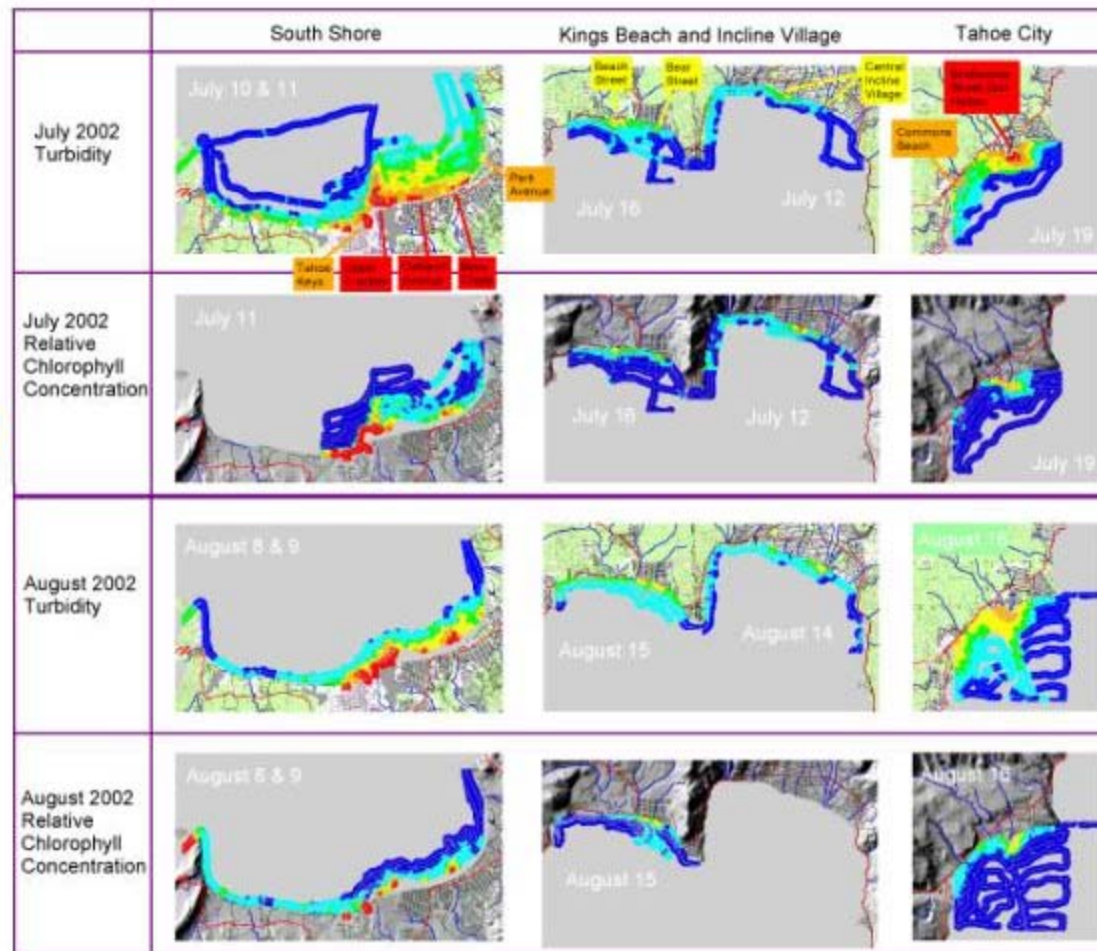
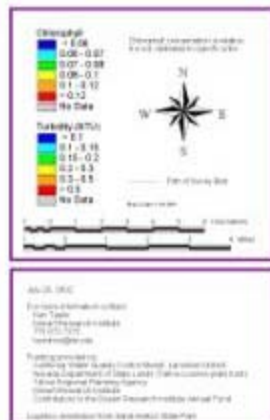
Chlorophyll
from algae

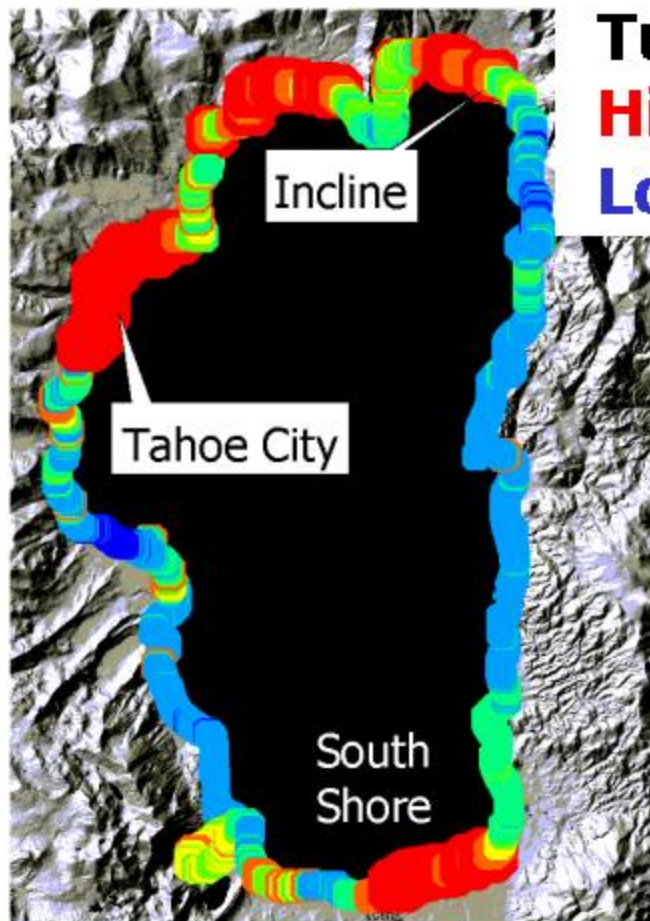
1 mile

Sept 18, 2001

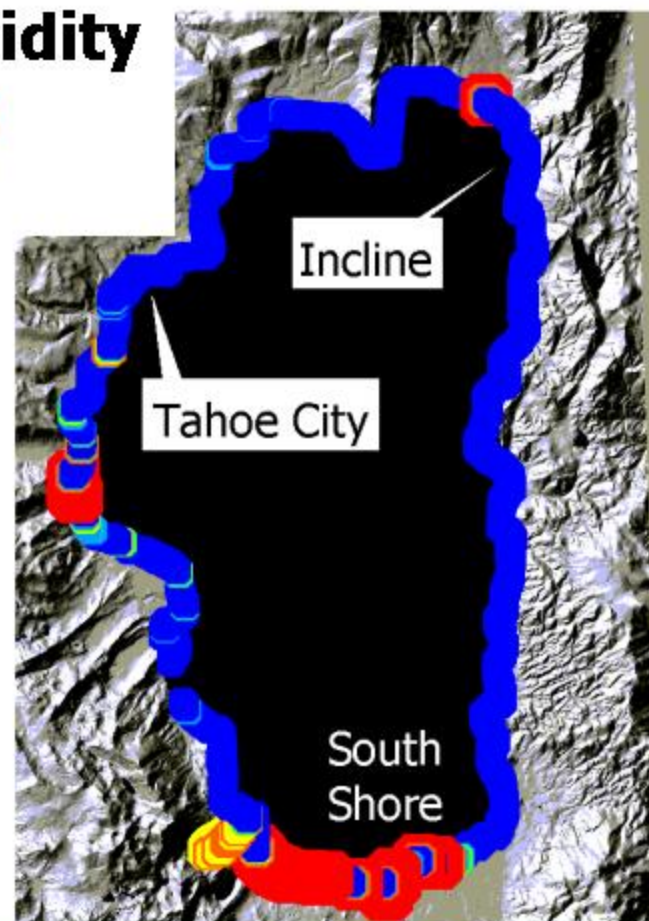
Lake Tahoe Near Shore Water Clarity: Location of Problem Areas

HOT SPOTS
Upper Truckee
El Tahoe
Bijou Creek
Star Harbor
Tahoe Keys
Park Avenue
Commons Beach



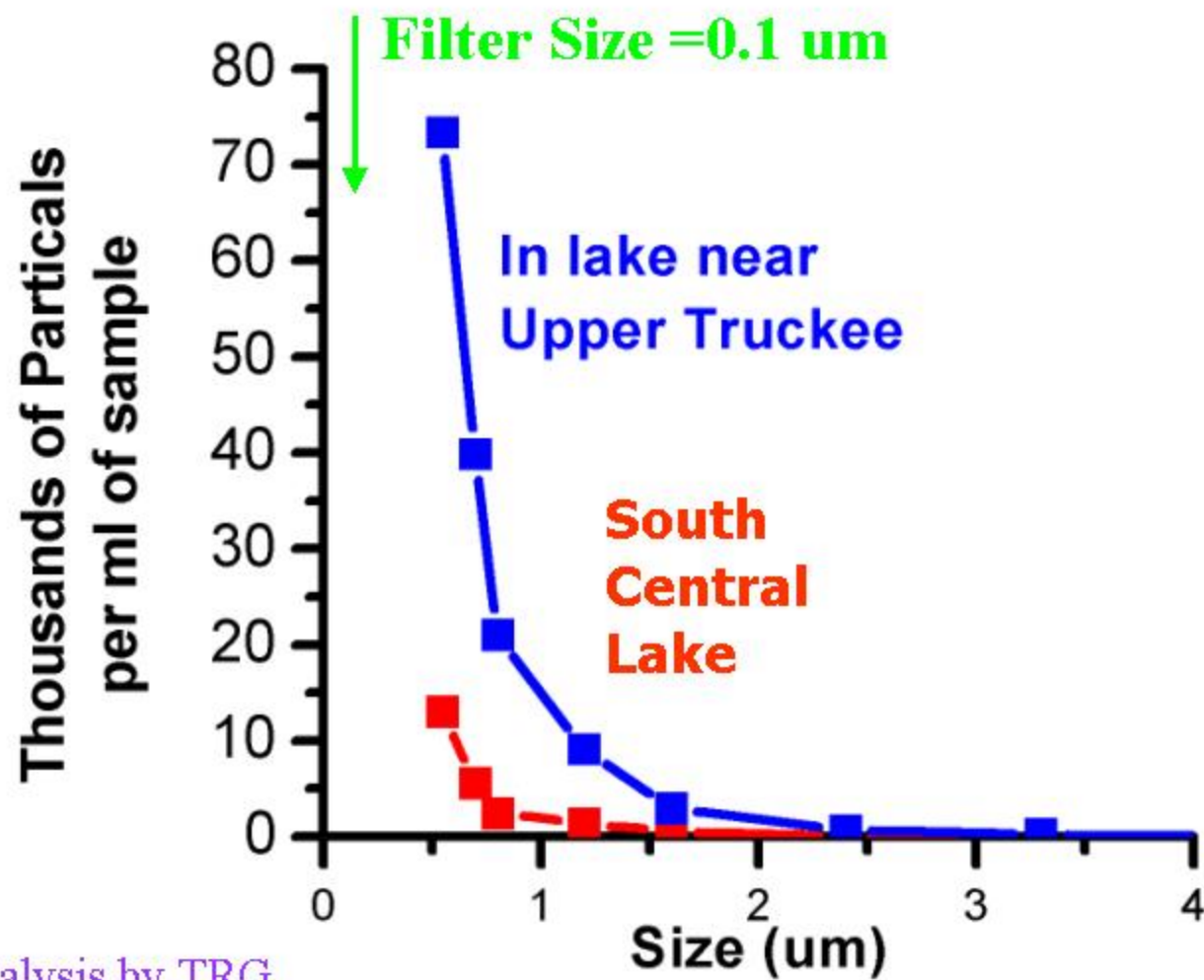


Turbidity
High
Low

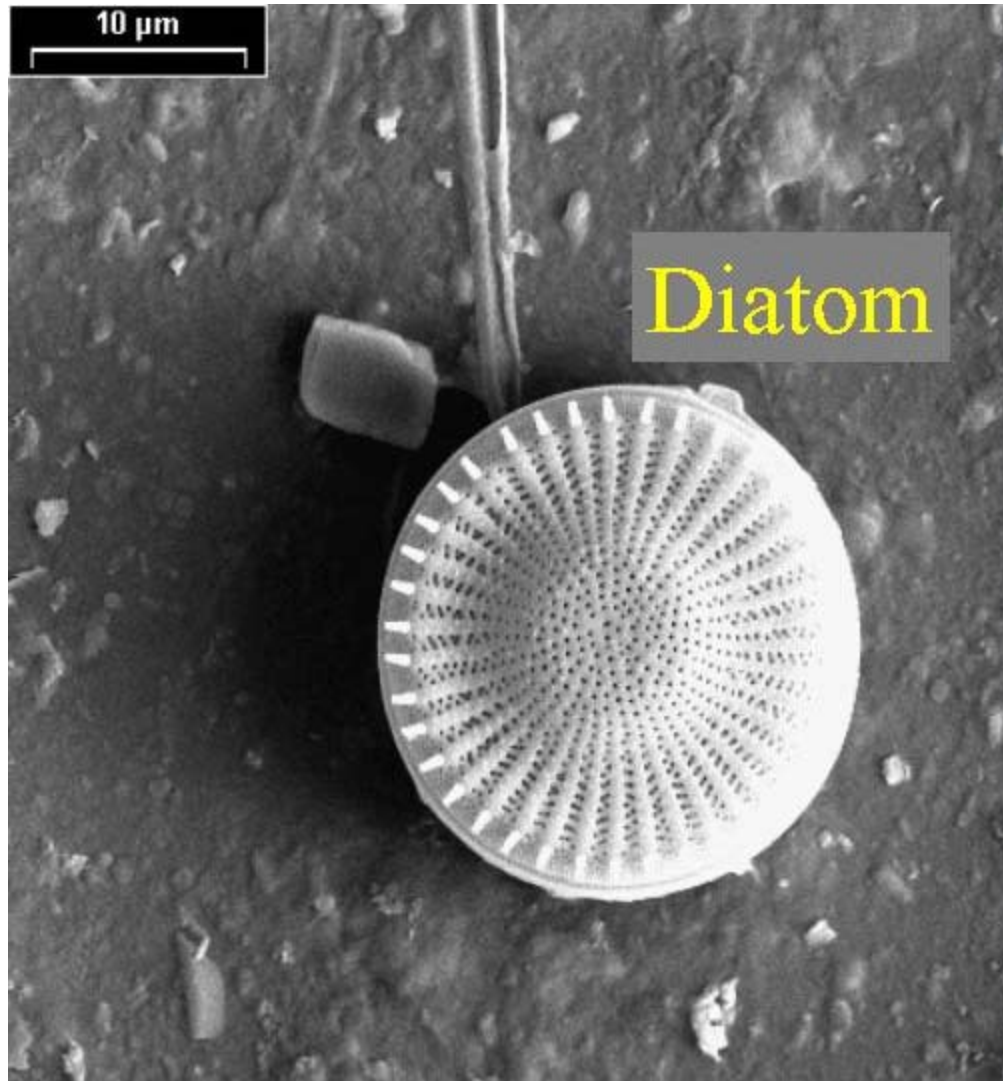


August 2000

March 2001

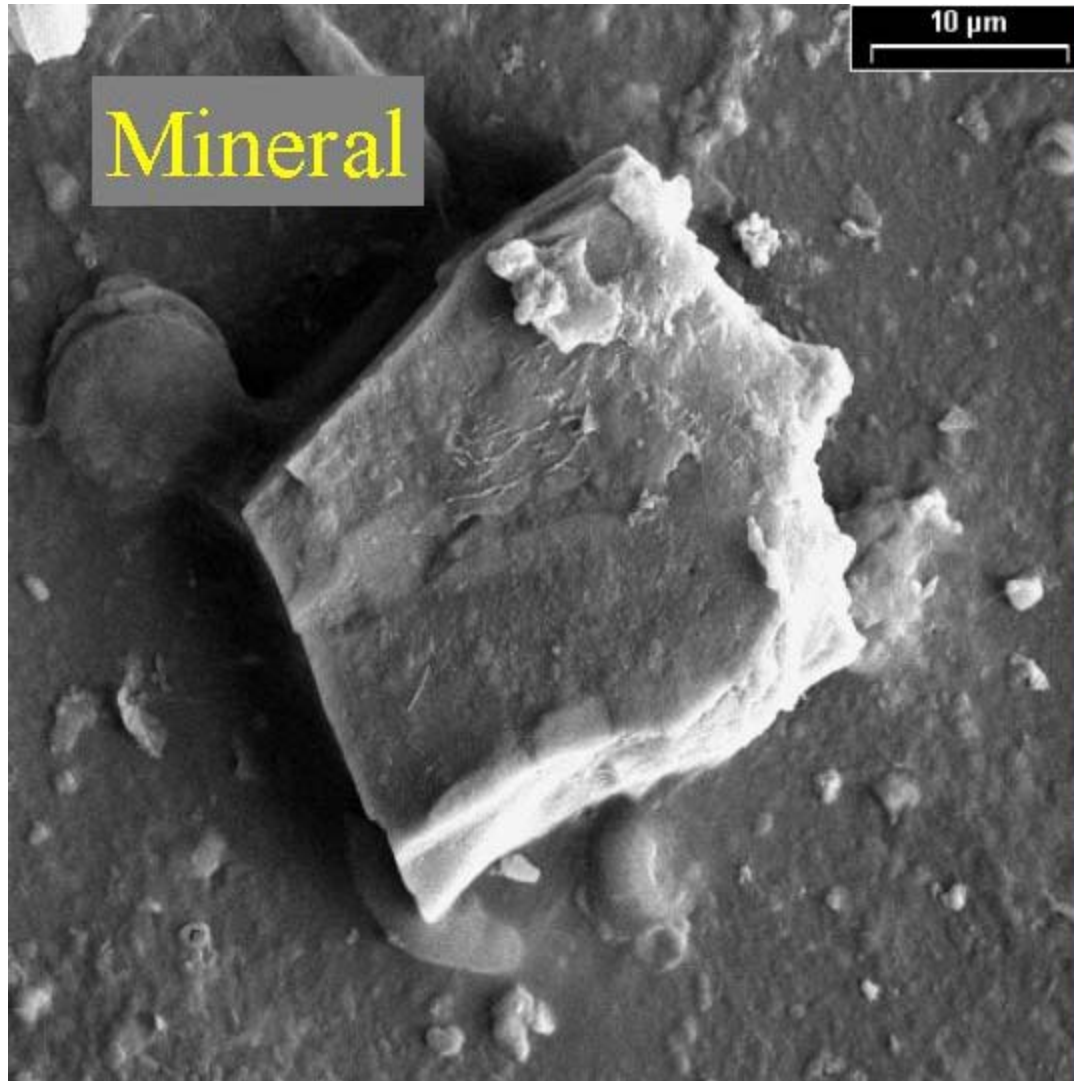


Analysis by TRG



Sand
Harbor

- 1 micron



Mineral

Sand
Harbor

● 1 micron



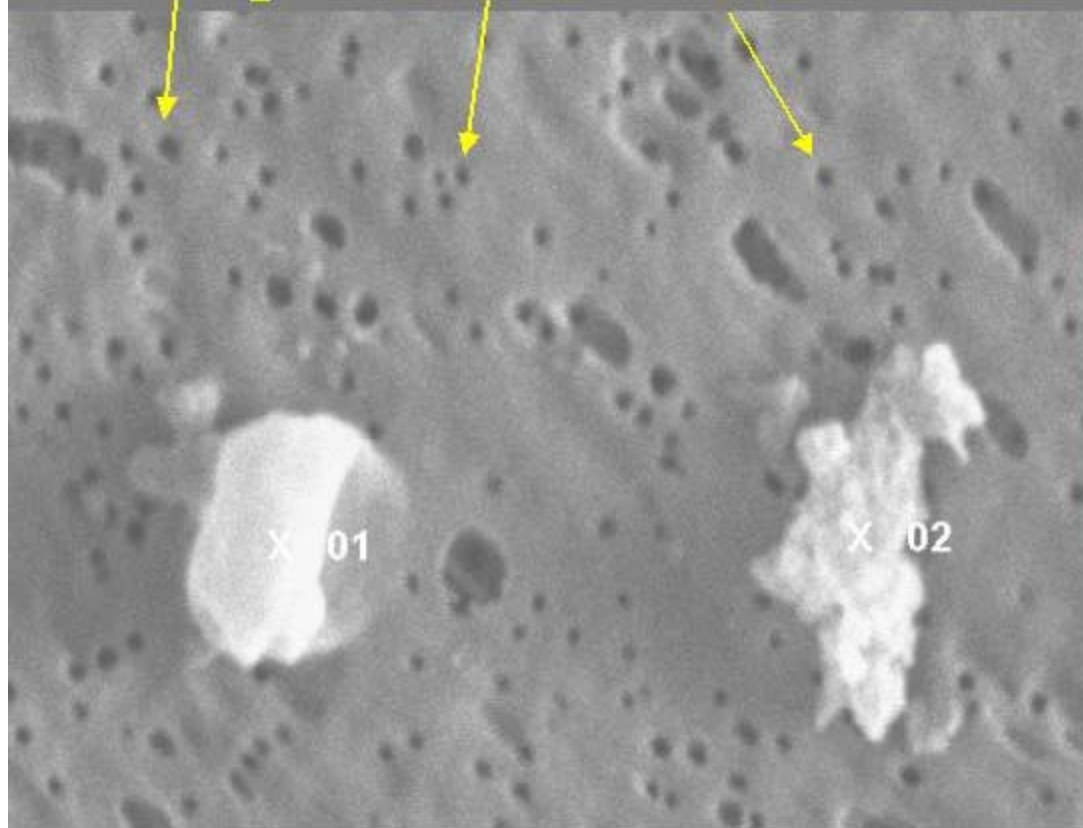
Organic

A scanning electron micrograph (SEM) showing a large, irregular, and textured organic particle. The particle has a complex, somewhat C-shaped or ring-like structure with a rough, bumpy surface. It is surrounded by a dark, granular background containing smaller, more uniform particles. A scale bar in the bottom left corner indicates 10 μm, and the magnification is 1500X.

Upper
Truckee
outlet

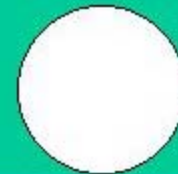
- 1 micron

Filter pores are 0.1 microns



South
Central
Lake

1 micron



1 μ m

What are these blobs?

Energy Dispersive Spectrometry

Use X-ray emissions to determine the relative concentration of elements in a selected area of an SEM image.

Organic material:

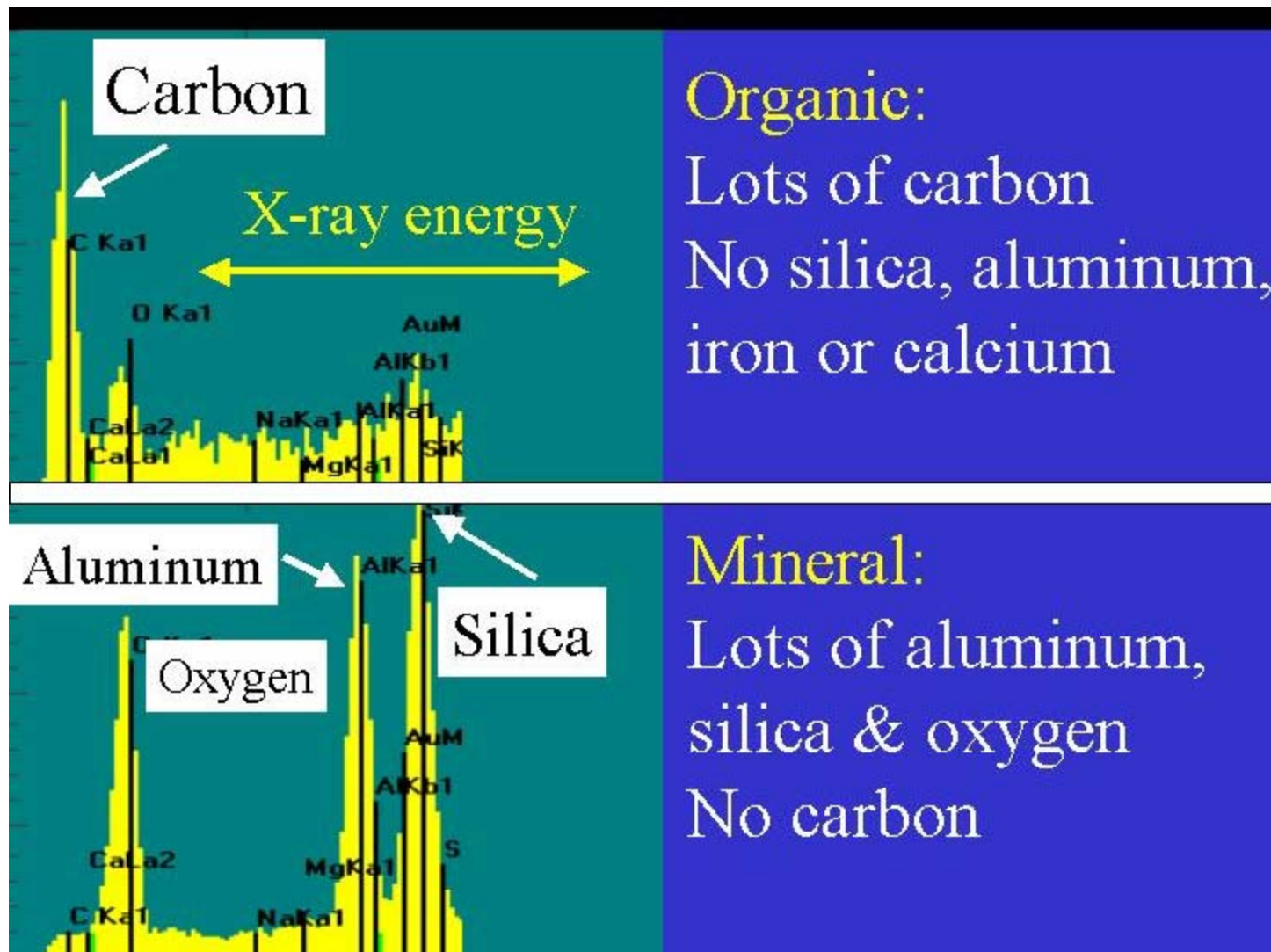
High in carbon, low silica or metals
metals=(aluminum, iron, calcium)

Diatoms:

High silica, no carbon or metals

Minerals:

A mix of silica, carbon and metals



In summer...

Nearshore areas with persistently high turbidity have organic particles.

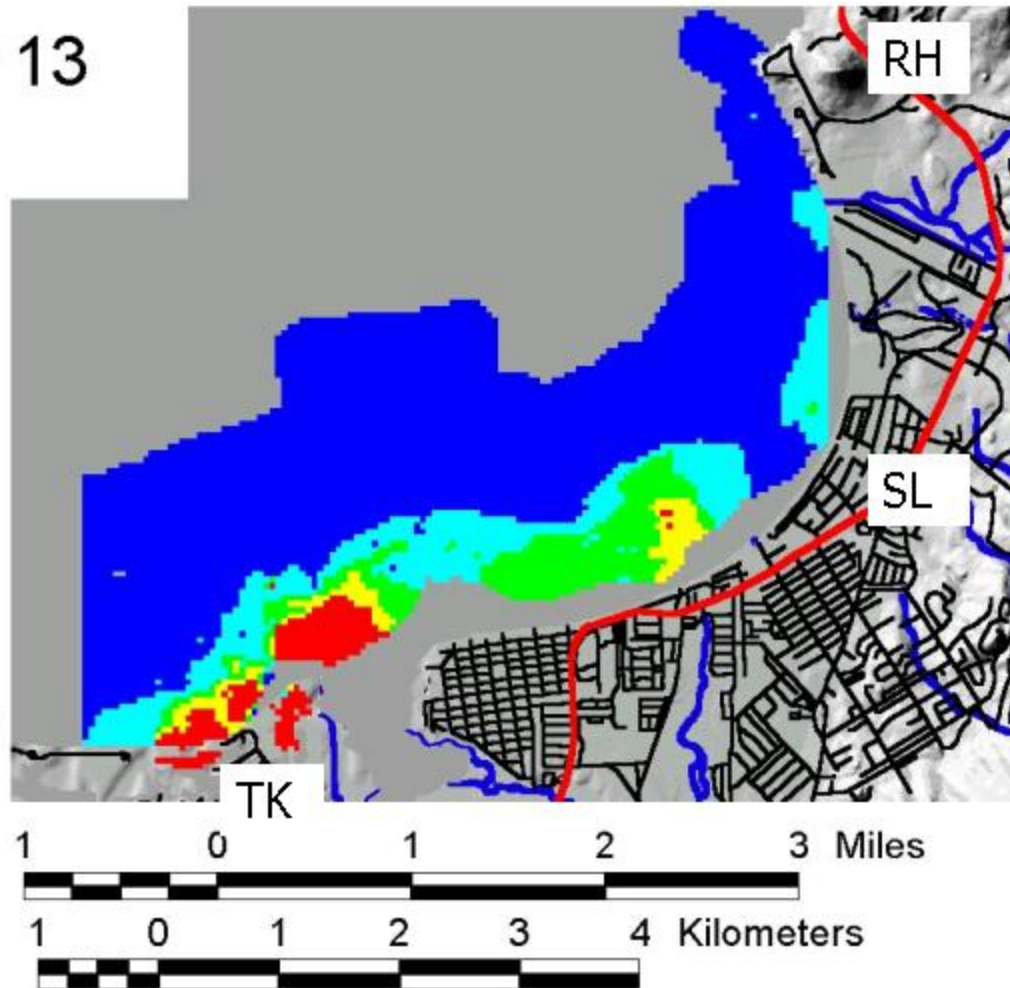
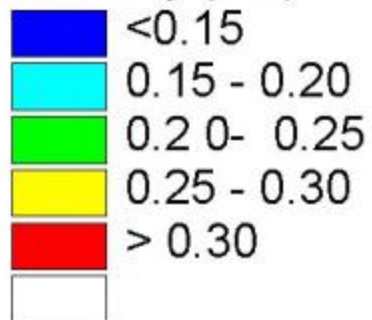
Off the Upper Truckee River outlet the particles are mostly organic, but there are a few mineral particles.



September 13
2002

Calm

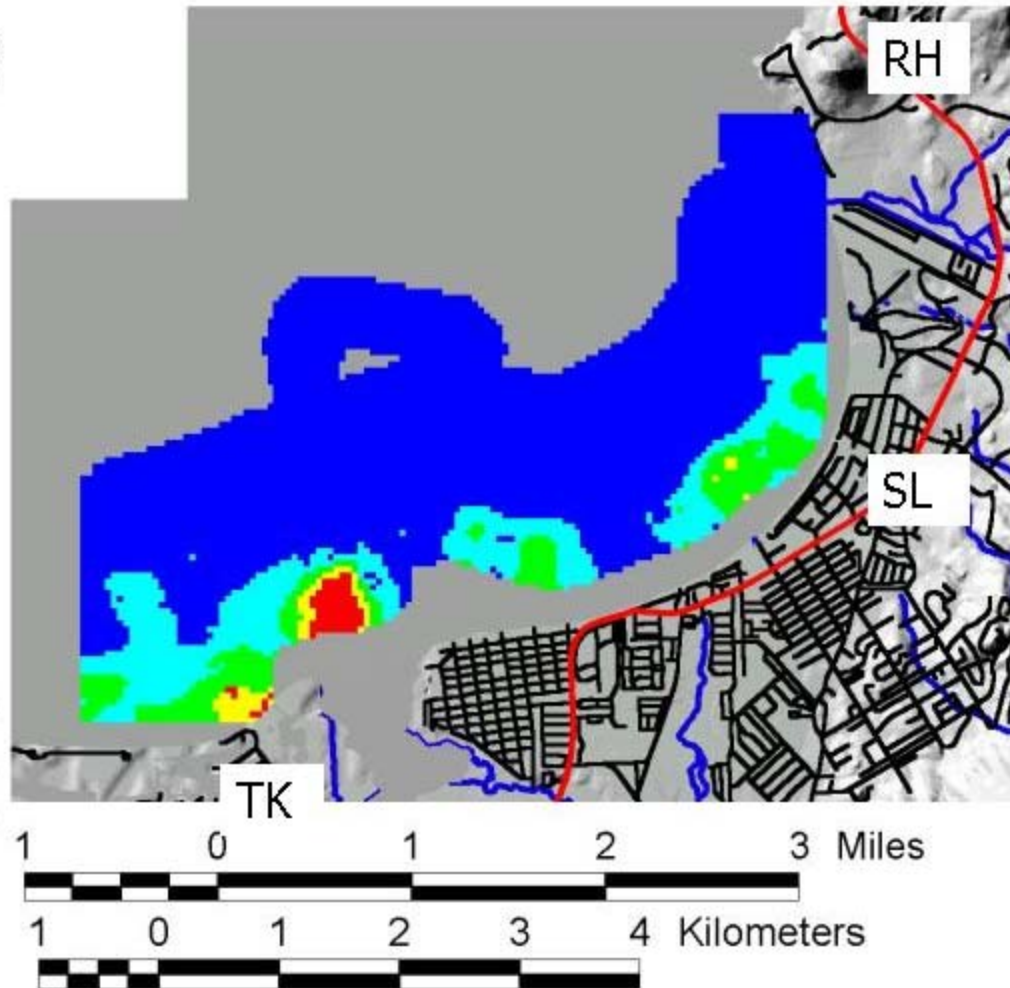
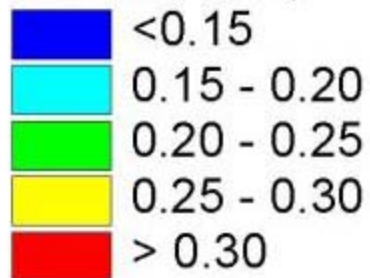
Turbidity (ntu)



October 22
2002

Calm

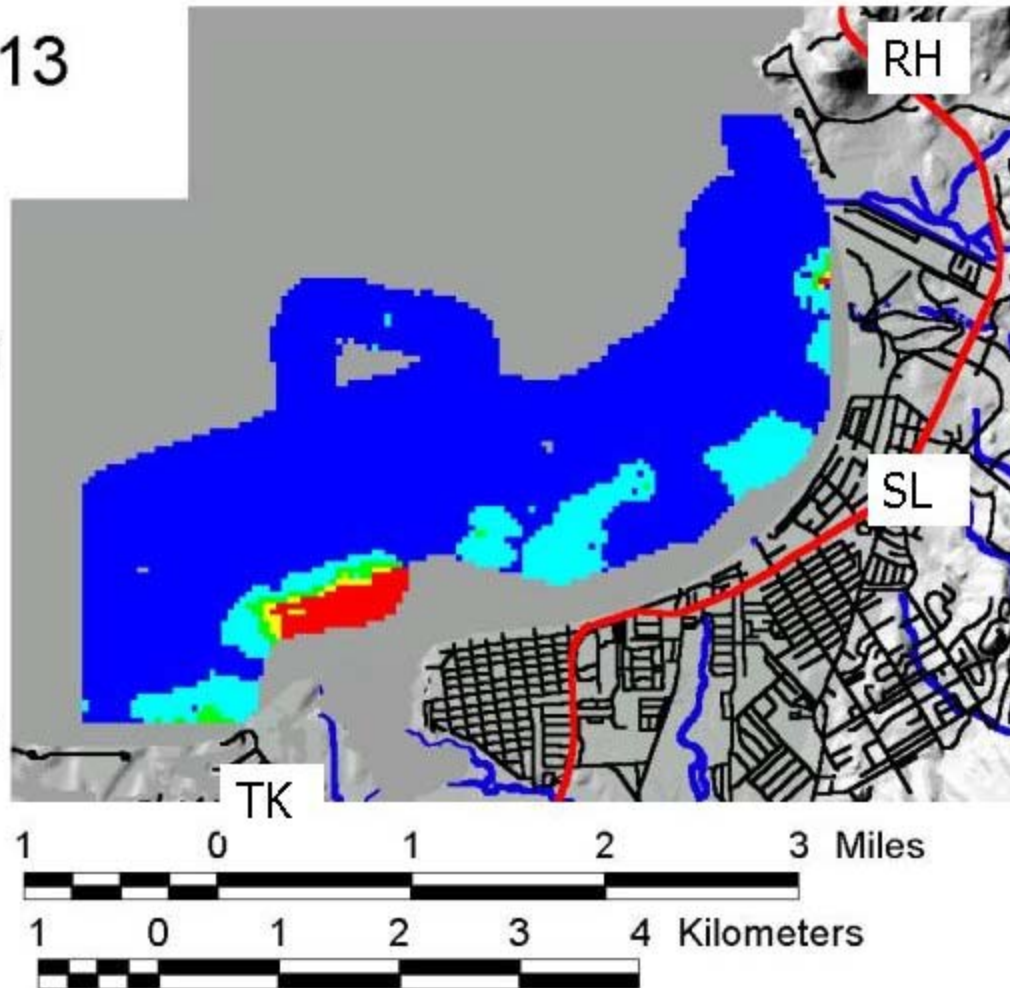
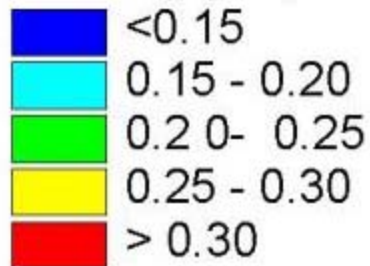
Turbidity (ntu)

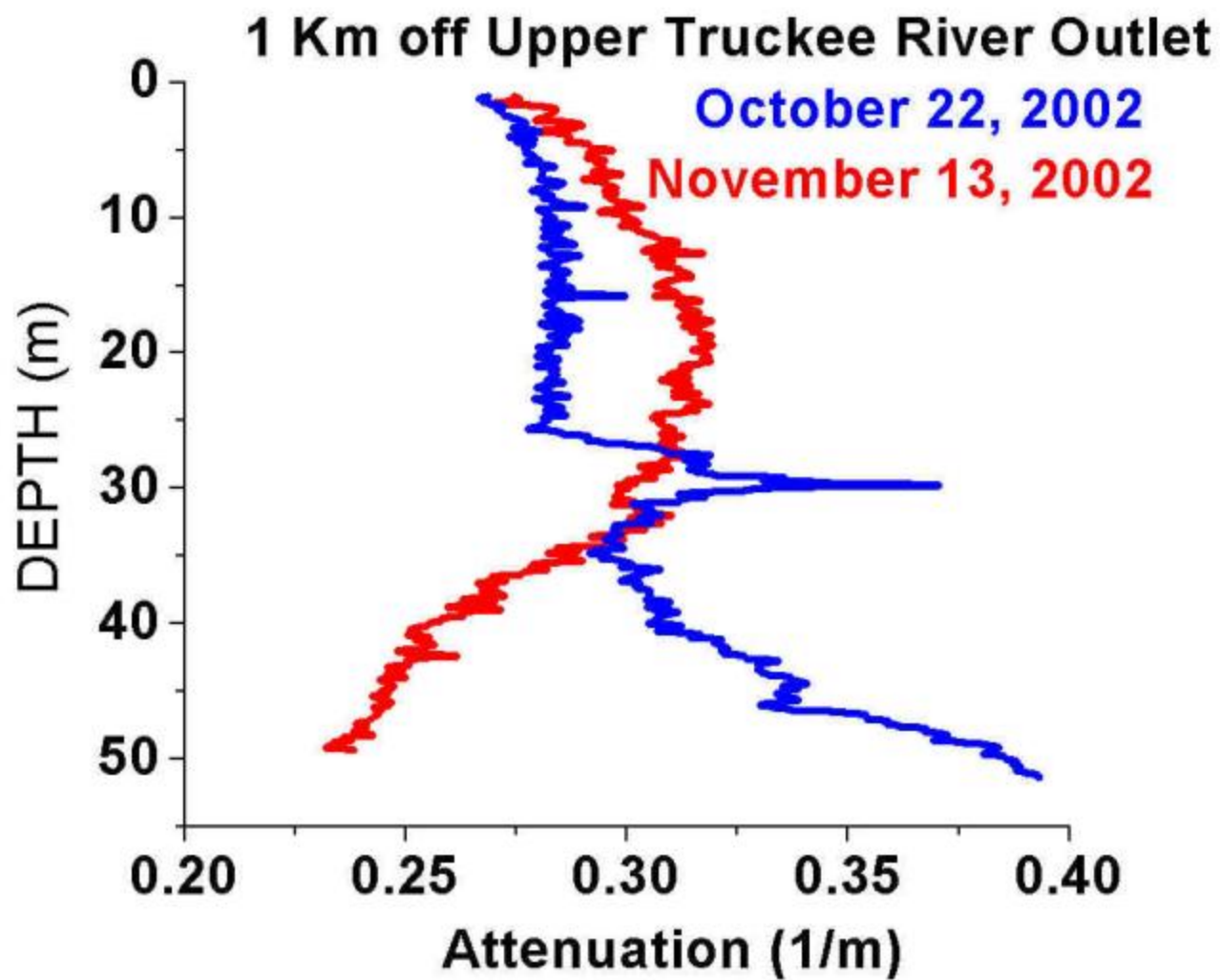


November 13
2002

After first
winter storm

Turbidity (ntu)





TMDL ISSUES

Kilometer scale problem areas associated with some developed areas in summer

Organic particles during the summer

Role of near shore mixing on mid lake?

Stay tuned for results from different types of storms

